

WHAT IS CLAIMED IS:

1. A medical apparatus guiding system comprising:
a medical apparatus having a medical apparatus main body inserted in the body cavity and a thrust generating mechanism arranged to the medical apparatus main body;
an information providing unit comprising at least one of a storing unit for storing a state of the thrust generating mechanism and a direction detecting unit for detecting the direction of the medical apparatus main body;
an input unit which instructs a thrust generating direction of the thrust generating mechanism; and
a control unit which changes a thrust generating state of the thrust generating mechanism based on information from the information providing unit.
2. A medical apparatus guiding system according to Claim 1, wherein the control unit continuously changes the thrust generating state of the thrust generating mechanism.
3. A medical apparatus guiding system according to Claim 1, wherein the input unit is an input unit which inputs the change amount of the thrust generating mechanism in the thrust generating direction.

4. A medical apparatus guiding system according to Claim 1, wherein the medical apparatus main body has an outer shape that is approximately cylindrical,

the thrust generating mechanism comprises a spiral structure portion arranged to the side surface of the medical apparatus main body and a rotation driving unit which rotates the spiral structure portion substantially around a cylindrical shaft of the medical apparatus main body, the rotation driving unit is arranged to the medical apparatus main body and comprises a magnet arranged to the substantially cylindrical shaft of the medical apparatus main body in the direction of the magnetic pole in the direction substantially orthogonal thereto and a magnetic field generating device which generates a magnetic field in an arbitrary direction,

the information providing unit comprises at least one of the storing unit which describes a state of the thrust generating mechanism, the direction detecting unit which detects the direction of the medical apparatus main body, and magnetic pole detecting means which detects the direction of the magnetic pole of the magnet, and

the control unit generates the rotating magnetic field from the magnetic field generating device and controls a state for generating the magnetic field of the magnetic field generating device based on information from the

information providing unit and the input unit.

5. A medical apparatus guiding system according to Claim 1, wherein the input unit is an input unit which inputs the thrust generating amount of the thrust generating mechanism.

6. A medical apparatus guiding system according to Claim 1, wherein the input unit has an automatic return mechanism which automatically returns the operation amount to zero upon stopping the operation.

7. A medical apparatus guiding system according to Claim 1, wherein the storing unit has a writing device which writes at least one of the current state of the thrust generating mechanism and the advancing direction of the medical apparatus main body.

8. A medical apparatus guiding system according to Claim 1, wherein the medical apparatus main body has a diagnosis/cure device such as a medication system or a body fluid extracting system.

9. A medical apparatus guiding system according to Claim 1, wherein the medical apparatus main body is a

capsule medical apparatus.

10. A medical apparatus guiding system according to Claim 1, wherein the medical apparatus main body is a capsule medical apparatus having an outer shape which is approximately cylindrical,

the thrust generating mechanism comprises a spiral structure portion arranged to the side surface of the medical apparatus main body and a rotation driving unit which rotates the spiral structure portion substantially around a cylindrical shaft of the medical apparatus main body, the rotation driving unit is arranged to the medical apparatus main body and comprises a magnet arranged to the substantially cylindrical shaft of the medical apparatus main body in the direction of the magnetic pole in the direction substantially orthogonal thereto and a magnetic field generating device which generates a magnetic field in an arbitrary direction,

the information providing unit comprises at least one of the storing unit which stores a state of the thrust generating mechanism, the direction detecting unit which detects the direction of the medical apparatus main body, and magnetic pole detecting means which detects the direction of the magnetic pole of the magnet, and

the control unit generates the rotating magnetic field

from the magnetic field generating device and controls a state for generating the magnetic field of the magnetic field generating device based on information from the information providing unit and the input unit.

11. A medical apparatus guiding system according to Claim 1, wherein the medical apparatus main body has an outer shape which is approximately cylindrical,

the thrust generating mechanism comprises a spiral structure portion arranged to the side surface of the medical apparatus main body and a rotation driving unit which rotates the spiral structure portion substantially around the cylindrical shaft of the medical apparatus main body.

12. A medical apparatus guiding system according to Claim 5, wherein the thrust generating mechanism has any of a magnetic field generating device, an electric field generating device, and a motor, and the thrust generating amount is controlled by any of a frequency of a rotating magnetic field, a frequency of a rotating electric field, and a rotating frequency of the motor.

13. A medical apparatus guiding system according to Claim 3, further comprising: an image pick-up device

arranged to the medical apparatus main body; a display device which displays an image picked up by the image pick-up device; and an interface which allocates the operating direction of the input unit to the up, down, right, and left sides of the image displayed on the display device,

the medical apparatus guiding system further comprising image rotation correcting means which cancels the rotation of the image generated upon rotating the medical apparatus main body by the rotating magnetic field,

wherein the image processed by the image rotation correcting means is displayed on the display means.

14. A medical apparatus guiding system according to Claim 3, further comprising: an image pick-up device arranged to the medical apparatus main body; a display device which displays an image picked up by the image pick-up device; and an interface which allocates the operation direction of the input unit to the up, down, right, and left sides of the image displayed on the display device.

15. A medical apparatus guiding system according to Claim 4, wherein the input unit is an input unit which inputs a rotating frequency of the rotating magnetic field generated by the magnetic field generating device.

16. A medical apparatus guiding system according to Claim 4, wherein the input unit is an input unit which inputs a rotating direction of the rotating magnetic field generated by the magnetic field generating device.

17. A medical apparatus guiding system according to Claim 4, wherein the input unit is an input unit which inputs the change amount of the direction of the rotating magnetic field generated by the magnetic field generating device.

18. A medical apparatus guiding system according to Claim 4, further comprising: an image pick-up device arranged to the medical apparatus main body; a display device which displays an image picked up by the image pick-up device; and an interface which allocates the operation direction of the input unit to the up, down, right, and left sides of the image displayed on the display device.

19. A medical apparatus guiding system according to Claim 4, further comprising: an image pick-up device arranged to the medical apparatus main body; a display device which displays an image picked up by the image pick-up device; an interface which allocates the operation direction of the input unit to the up, down, right, and left

sides of the image displayed on the display device; and image rotation correcting means which cancels the rotation of the image generated upon rotating the medical apparatus main body by the rotating magnetic field, wherein the image processed by the image rotation correcting means is displayed on the display device.

20. A medical apparatus guiding system according to Claim 4, wherein upon changing the rotating frequency of the medical apparatus main body, the control unit continuously changes the rotating frequency of the rotating magnetic field.

21. A medical apparatus guiding system according to Claim 4, wherein upon changing the strength of the magnetic field generated from the magnetic field generating device, the control unit controls strength of the magnetic field so that it is continuously changed.

22. A medical apparatus guiding system according to Claim 4, wherein the magnet is arranged approximately at the position of the center of gravity in the capsule medical apparatus.

23. A medical apparatus guiding system according to

Claim 4, wherein the magnet is arranged near the end portion of the capsule medical apparatus.

24. A medical apparatus guiding system according to Claim 4, wherein the information providing unit comprises at least two or more of the storing unit, the direction detecting unit, and the magnetic pole detecting means, and the control unit changes the information providing unit referred to based on the control history.

25. A medical apparatus guiding system according to Claim 4, wherein the input unit has an automatic return mechanism which automatically returns the operation amount to zero upon stopping the operation.

26. A medical apparatus guiding system according to Claim 4, wherein the storing unit has a writing device which writes at least one of the current state of the thrust generating mechanism and the advancing direction of the medical apparatus main body.

27. A medical apparatus guiding system according to Claim 4, wherein the control unit continuously changes the thrust generating mechanism of the thrust generating mechanism.

28. A medical apparatus guiding system according to Claim 4, wherein the medical apparatus main body has a diagnosis/cure device such as a medication system or a body fluid extracting system.

29. A medical apparatus guiding system according to Claim 10, wherein the input unit is an input unit which inputs a rotating frequency of the rotating magnetic field generated by the magnetic field generating device.

30. A medical apparatus guiding system according to Claim 10, wherein the input unit is an input unit which inputs a rotating direction of the rotating magnetic field generated by the magnetic field generating device.

31. A medical apparatus guiding system according to Claim 10, wherein the input unit is an input unit which inputs the change amount of the direction of the rotating magnetic field generated by the magnetic field generating device.

32. A medical apparatus guiding system according to Claim 10, further comprising: an image pick-up device arranged to the medical apparatus main body; a display

device which displays an image picked up by the image pick-up device; and an interface which allocates the operation direction of the input unit to the up, down, right, and left sides of the image displayed on the display device.

33. A medical apparatus guiding system according to Claim 10, further comprising: an image pick-up device arranged to the medical apparatus main body; a display device which displays an image picked up by the image pick-up device; an interface which allocates the operation direction of the input unit to the up, down, right, and left sides of the image displayed on the display device; and image rotation correcting means which cancels the rotation of the image generated upon rotating the medical apparatus main body by the rotating magnetic field, wherein the image processed by the image rotation correcting means is displayed on the display device.

34. A medical apparatus guiding system according to Claim 10, wherein upon changing the rotating frequency of the medical apparatus main body, the control unit continuously changes the rotating frequency of the rotating magnetic field.

35. A medical apparatus guiding system according to

Claim 10, wherein upon changing the strength of the magnetic field generated from the magnetic field generating device, the control unit controls the strength of the magnetic field so that it is continuously changed.

36. A medical apparatus guiding system according to Claim 10, wherein the magnet is arranged approximately at the position of the center of gravity in the capsule medical apparatus.

37. A medical apparatus guiding system according to Claim 10, wherein the magnet is arranged near the end portion of the capsule medical apparatus.

38. A medical apparatus guiding system according to Claim 10, wherein the information providing unit comprises at least two or more of the storing unit, the direction detecting unit, and the magnetic field detecting means, and the control unit changes the information providing unit referred to based on the control history.

39. A medical apparatus guiding system according to Claim 10, wherein the input unit has an automatic return mechanism which automatically returns the operation amount to zero upon stopping the operation.

40. A medical apparatus guiding system according to Claim 10, wherein the storing unit has a writing device which writes at least one of the current state of the thrust generating mechanism and the advancing direction of the medical apparatus main body.

41. A medical apparatus guiding system according to Claim 10, wherein the control unit continuously changes the thrust generating state of the thrust generating mechanism.

42. A medical apparatus guiding system according to Claim 10, wherein the medical apparatus main body has a diagnosis/cure device such as a medication system or a body fluid extracting system.

43. A medical apparatus guiding system according to Claim 11, wherein the thrust generating mechanism is a motor.

44. A medical apparatus guiding system according to Claim 11, further comprising: a power supply unit which is extracorporeally arranged; and a power transmitting unit which connects the power supply unit and the thrust generating mechanism.

45. A medical apparatus guiding system according to Claim 11, wherein the input unit is an input unit which inputs a rotating frequency of the rotating magnetic field generated from the magnetic field generating device.

46. A medical apparatus guiding system according to Claim 11, wherein the storing unit has a writing device which writes at least one of the current state of the thrust generating mechanism and the advancing direction of the medical apparatus main body.

47. A medical apparatus guiding system according to Claim 11, wherein the control unit continuously changes the thrust generating state of the thrust generating mechanism.

48. A medical apparatus guiding system according to Claim 11, wherein the medical apparatus main body has a diagnosis/cure device such as a medication system or a body fluid extracting system.

49. A medical apparatus guiding system according to Claim 11, further comprising: an image pick-up device arranged to the medical apparatus main body; a display device which displays an image picked up by the image pick-up device; and an interface which allocates the operation

direction of the input unit to the up, down, right, and left sides of the image displayed on the display device.

50. A medical apparatus guiding system according to Claim 11, wherein the information providing unit comprises at least two or more of the storing unit, the direction detecting unit, and the magnetic pole detecting means, and the control unit changes the information providing unit referred to based on the control history.

51. A medical apparatus guiding system according to Claim 11, wherein the input unit has an automatic return mechanism which automatically returns the operation amount to zero upon stopping the operation.

52. A control method of a medical apparatus guiding system comprising:

- a step of reading an instructing signal in a thrust generating direction;

- a step of obtaining a control signal of a thrust generating mechanism until an arbitrary time;

- a step of writing, to a storing unit, a state of the thrust generating mechanism after the arbitrary time; and

- a step of transmitting the control signal to the thrust generating mechanism and driving the thrust generating

mechanism.

53. A control method of a medical apparatus guiding system according to Claim 52, further comprising:

a step of reading, from the storing unit, the state of the thrust generating mechanism;

a step of reading the instructing signal in the thrust generating direction;

a step of obtaining the control signal of the thrust generating mechanism until the arbitrary time;

a step of writing, to the storing unit, the state of the thrust generating mechanism after the arbitrary time; and

a step of transmitting the control signal to the thrust generating mechanism and driving the thrust generating mechanism.

54. A control method of a medical apparatus guiding system according to Claim 53, wherein at the time at which the control signal is transmitted to the thrust generating mechanism and the thrust generating mechanism is driven,

the step of reading the state of the thrust generating mechanism from the storing unit is restarted.

55. A control method of a medical apparatus guiding

system according to Claim 52, further comprising:

- a step of detecting the direction of the medical apparatus main body;

- a step of reading the instructing signal in the thrust generating direction;

- a step of obtaining the control signal of the thrust generating mechanism until the arbitrary time; and

- a step of transmitting the control signal to the thrust generating mechanism and driving the thrust generating mechanism.

56. A control method of a medical apparatus guiding system according to Claim 55, wherein at the time at which the control signal is transmitted to the thrust generating mechanism and the thrust generating mechanism is driven,

the step of detecting the direction of the medical apparatus main body is restarted.

57. A control method of a medical apparatus guiding system according to Claim 52, further comprising:

- a step of detecting the direction of the medical apparatus main body;

- a step of reading an input signal from the input unit;

- a step of obtaining a magnetic field generating signal until the arbitrary time, which is generated by the magnetic

field generating device based on the direction of the medical apparatus main body and the input signal from the input unit; and

a step of transmitting the magnetic field generating signal to the magnetic field generating device and driving the thrust generating device.

58. A control method of a medical apparatus guiding system according to Claim 57, wherein during the step of transmitting the magnetic field generating signal to the magnetic field generating device and driving the magnetic field generating device, the step of detecting the direction of the medical apparatus main body is restarted.

59. A control method of a medical apparatus guiding system according to Claim 52, further comprising:

a step of detecting the direction of the medical apparatus main body;

a step of detecting the direction of a magnetic pole of a magnet arranged to the medical apparatus main body;

a step of reading an input signal from the input unit;

a step of obtaining a magnetic field generating signal until the arbitrary time, which is generated by the magnetic field generating device based on the direction of the medical apparatus main body, the direction of the magnetic

pole of the magnet arranged to the medical apparatus main body and the input signal from the input unit; and

a step of transmitting the magnetic field generating signal to the magnetic field generating device and driving the magnetic field generating device.

60. A control method of a medical apparatus guiding system according to Claim 59, wherein during the step of transmitting the magnetic field generating signal to the magnetic field generating device and driving the magnetic field generating device,

the step of detecting the direction of the medical apparatus main body is restarted.

61. A control method of a medical apparatus guiding system according to Claim 52, further comprising:

a step of reading the state of the magnetic field generating device from the storing unit;

a step of detecting the direction of the medical apparatus main body;

a step of detecting the direction of a magnetic pole of a magnet arranged to the medical apparatus main body;

a step of reading an input signal from an input unit;

a step of obtaining a magnetic field generating signal until the arbitrary time, which is generated by the magnetic

field generating device based on the direction of the medical apparatus main body, the direction of the magnetic pole of the magnet arranged to the medical apparatus main body and the input signal from the input unit;

a step of storing the state of the magnetic field generating device after the arbitrary time to the storing unit; and

a step of transmitting the magnetic field generating signal to the magnetic field generating device and driving the magnetic field generating device.

62. A control method of a medical apparatus guiding system according to Claim 61, wherein during the step of transmitting the magnetic field generating signal to the magnetic field generating device and driving the magnetic field generating device, the step of detecting the direction of the medical apparatus main body is restarted.